O.R.M.C. DIAPHRAGM REPLACEMENT, CLEANING AND TEST PROCEDURES

NOTE:

Prior to performing any of the ORMC service procedures, verify the type of alarm panel on the machine (Applies to Narkomed 2B, 3 and 4).

If the alarm panel is as shown in Figure 1, perform all of the following procedures.

If the alarm panel is as shown in Figure 2, disregard any steps referring to the "O_2/N_2O FLOW RATIO" alarm.

ORMC DIAPHRAGM REPLACEMENT PROCEDURE

Tools Required: ⅜ in. open end wrench
3/32 in. Allen wrench
adjustable wrench

1. Turn the System Power switch to ON.
2. Close all cylinder valves, and disconnect the pipeline supply hoses at the wall outlets.
3. Depressurize the machine. The cylinder and pipeline gauges should read zero.
4. Turn the System Power switch to STANDBY.
5. Remove the ORMC from the machine.
6. Scribe a line lengthwise across the top blocks of the ORMC and identify each block with a number.
7. Remove the four hex nuts on the end of the ORMC with a ⅜ in. open end wrench. Refer to Figure 3.
8. Carefully disassemble the ORMC by pulling the blocks off the bolts.
9. Carefully remove the two end blocks.
10. Unscrew the oxygen diaphragm/shaft assembly from the nitrous oxide diaphragm/shaft assembly.
11. Loosen the nut securing the spacer and the oxygen diaphragm to the shaft.
12. Remove the oxygen diaphragm from the shaft.
13. Install the new diaphragm.
14. Secure the oxygen diaphragm and spacer to the shaft with the nut.

ORMC DIAPHRAGM REPLACEMENT PROCEDURE (continued)

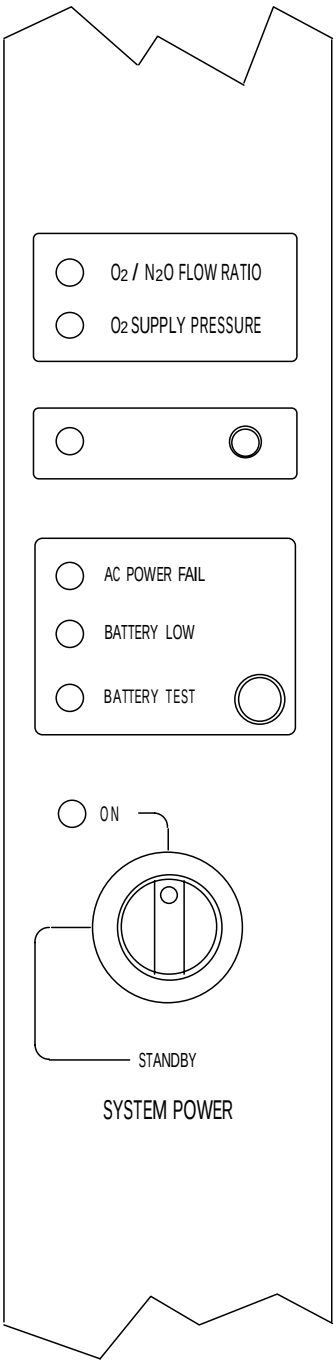

Figure 1: ALARM PANEL WITH O_2/N_2O ALARM LAMP

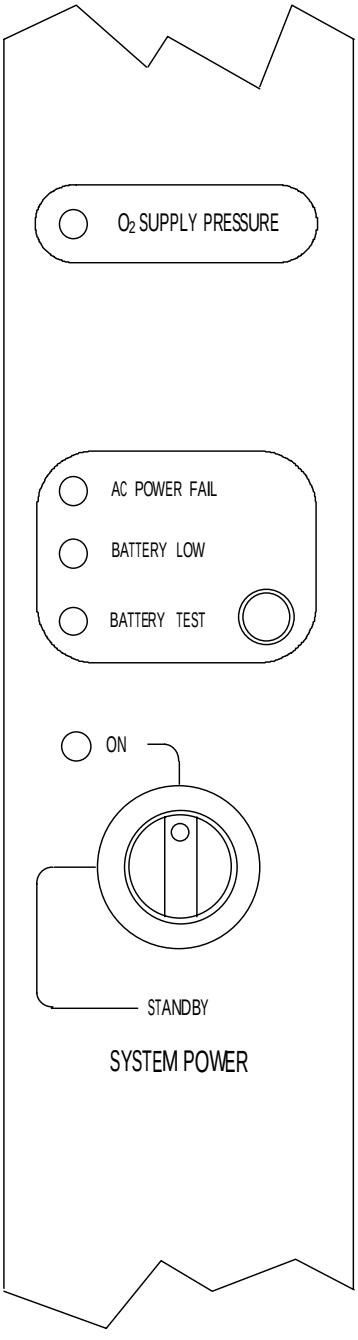

Figure 2: ALARM PANEL W/O O_2/N_2O ALARM LAMP

ORMC DIAPHRAGM REPLACEMENT PROCEDURE (continued)

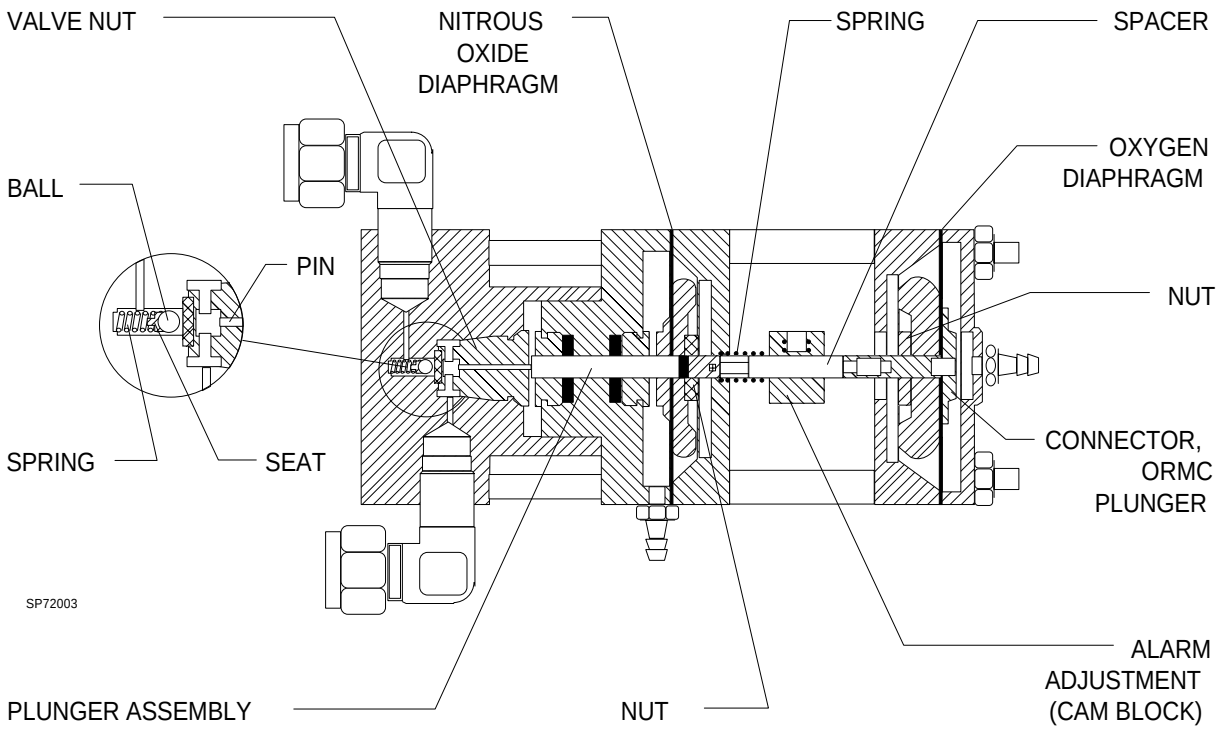

Figure 3: ORMC ASSEMBLY

ORMC DIAPHRAGM REPLACEMENT PROCEDURE (continued)

15. Remove the block from the nitrous oxide/shaft assembly.

16. Loosen the set screw securing the bracket for the alarm adjustment assembly to the nitrous oxide/shaft assembly.

17. Remove the bracket for the alarm adjustment assembly from the nitrous oxide/shaft assembly.

18. Remove the spring from the nitrous oxide/shaft assembly.

19. Remove the block from the nitrous oxide/shaft assembly.

20. Loosen the nut securing the spacer and the nitrous oxide diaphragm to the shaft.

21. Remove the nitrous oxide diaphragm from the shaft.

22. Install the new diaphragm.

23. Secure the nitrous oxide diaphragm and spacer to the shaft with the nut.

24. Install the block with the groove onto the nitrous oxide/shaft assembly.

NOTE: The groove should face away from the diaphragm.

25. Install the spring onto the nitrous oxide/shaft assembly.

26. Install the bracket for the alarm adjustment assembly onto the nitrous oxide/shaft assembly.

NOTE: The groove should face the spring.

27. Install the block onto the nitrous oxide/shaft assembly.

NOTE: The smooth side should face the cam adjustment assembly.

28. Screw the oxygen diaphragm/shaft assembly onto the nitrous oxide/shaft assembly.

29. Align the scribe marks on the blocks.

30. Carefully slide the blocks onto the four bolts.

31. Insert the spacers between the oxygen and the nitrous oxide diaphragm housings.

32. Secure the ORMC assembly with the four lock washers and nuts.

33. Install the ORMC into the machine.

34. Test the ORMC for leaks and proper operation as per the ORMC SET UP AND TEST PROCEDURE.

ORMC CLEANING PROCEDURE

Symptom: With the N_2O flow control valve open and the O_2 flow control valve closed, the N_2O continues to flow.

Tools Required: ⅜ in. open end wrench, 7/16 in. nut driver, 70% isopropyl alcohol

1. Turn the System Power switch to ON.
2. Close all cylinder valves, and disconnect the pipeline supply hoses at the wall outlets.
3. Depressurize the machine. The cylinder and pipeline gauges should read zero.
4. Turn the System Power switch to STANDBY.
5. Remove the ORMC from the machine.
6. Scribe a line lengthwise across the top blocks of the ORMC and identify each block with a number.
7. Remove the four hex nuts on the end of the ORMC with a ⅜ in. open end wrench. Refer to Figure 3.
8. Carefully disassemble the ORMC by pulling the blocks off the bolts.
9. With needle nose pliers, remove the plunger pin from the valve nut.
10. Remove the valve nut from the controller block with a 7/16 in. nut driver.
11. Remove the ball from the controller block.
12. Remove the ball seat from the controller block.
13. Remove the spring from the controller block.
14. Clean the plunger pin, valve nut, ball, ball seat and spring with 70% isopropyl alcohol.
15. Inspect the bottom of the controller block for dirt and clean with 70% isopropyl alcohol if necessary.
16. Allow all parts to dry.
17. Install the spring into the controller block.
18. Install the ball seat into the controller block.
19. Install the ball into the controller block.
20. Install the valve nut into the controller block.
21. Install the plunger pin into the controller block.
22. Align the scribe marks ensuring the proper sequence of numbered blocks.
23. Carefully slide the blocks onto the four bolts.
24. Insert the spacers between the oxygen and the nitrous oxide diaphragm housings.
25. Secure the ORMC assembly with the four lock washers and nuts.
26. Install the ORMC into the machine.
27. Test the ORMC for leaks and proper operation as per the ORMC SET UP AND TEST PROCEDURE.

ORMC SET UP AND TEST PROCEDURE

Tools Required: 3/32 in. Allen wrench

1. Open the O_2 and N_2O cylinder valves and connect the pipeline supply hoses to the wall outlets.
2. Turn the System Power switch to ON.
3. Place the Gas Selector switch in the O_2 + N_2O position.
4. Place the Manual/Automatic selector valve in the MANUAL position.
5. Close the APL valve.
6. Attach a test terminal w/squeeze bulb to the bag mount.
7. Disconnect the 22 mm ventilator hose from the Manual/Automatic selector valve mount and attach it to the inspiratory valve.
8. Activate the scavenger system.
9. Ensure that the O_2 monitor is functioning properly and calibrate it to 21% O_2.
10. Place the O_2 sensor housing into the inspiratory valve dome.
11. Close all flow control valves.
12. Depress the O_2 FLUSH for 15 seconds.
13. Turn the nitrous oxide flow control valve counter-clockwise to its stop position.
14. Is there nitrous oxide flow? ____ (N)
15. If there is NO nitrous oxide flow, skip to Step 19.
16. If there is nitrous oxide flow, loosen set screw E. See Figure 4.
17. Move cam block F to the right until the nitrous oxide flow stops.
18. Tighten set screw E.
19. Slowly increase the oxygen flow until the nitrous oxide begins to flow.
20. What is the oxygen flow rate? _____ (200-300 ml/min.)
21. If the nitrous oxide begins to flow at a point between 200 and 300 ml/min. of oxygen flow, then skip to Step 25.
22. If the nitrous oxide does not begin to flow at a point between 200 and 300 ml/min. of oxygen flow, then loosen set screw E.
23. Move cam block F to the left until the nitrous oxide flow begins at a point between 200 and 300 ml/min. of oxygen flow.
24. Tighten set screw E.
25. Repeat Steps 11 thru 25 until no further adjustment is required.
26. Adjust the oxygen flow to achieve 10 L/min. of nitrous oxide flow.
27. What is the oxygen concentration? _____% (21-29)
28. Is the O_2/N_2O FLOW RATIO alarm activated? _____ (Y)
29. If YES, then skip to Step 37.

ORMC SET UP AND TEST PROCEDURE (continued)

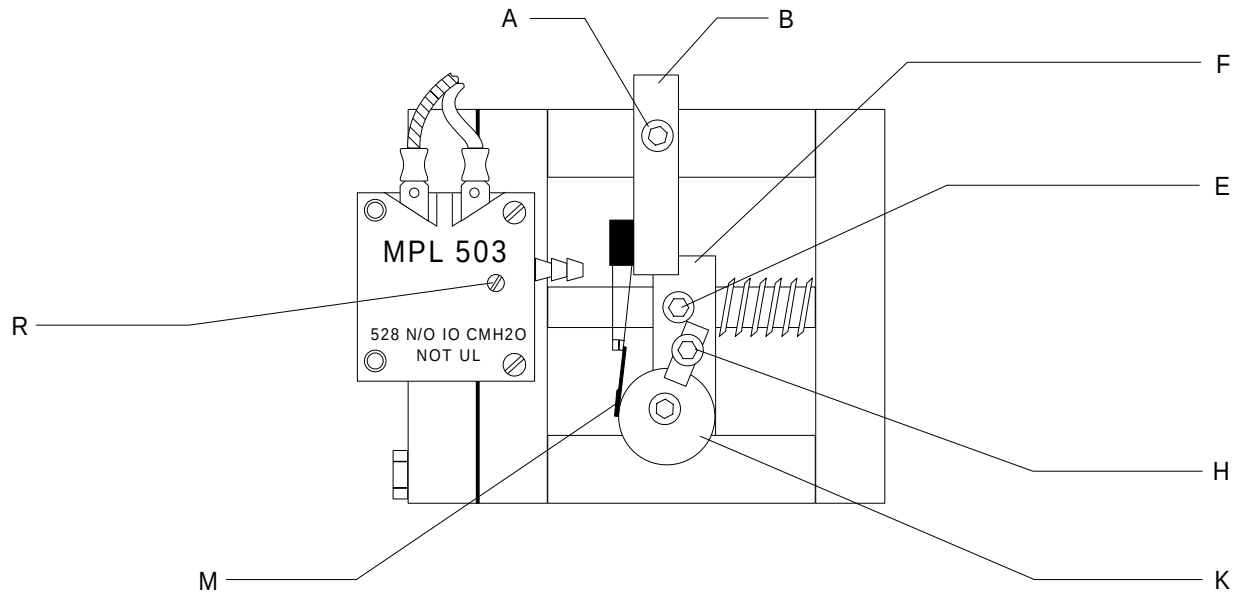

Figure 4: ORMC ADJUSTMENTS

ORMC SET UP AND TEST PROCEDURE (continued)

30. If the O_2/N_2O FLOW RATIO alarm is not activated, loosen cap screw H. See Figure 4.

31. Turn cap screw J counter-clockwise until cam wheel K is even with cam block F.

32. Loosen set screw A.

33. Move switch mounting block B until switch lever M is close to cam wheel K.

34. Tighten set screw A.

35. Turn cap screw J clockwise to activate the O_2/N_2O FLOW RATIO alarm.

36. Tighten cap screw H.

37. Close the nitrous oxide flow control valve.

38. Set the oxygen flow to 1000 ml/min.

39. Slowly open the nitrous oxide flow control valve until the ORMC controls the nitrous oxide.

40. Does the O_2/N_2O FLOW RATIO alarm activate as soon as the ORMC limits the nitrous oxide flow? _____ (Y)

41. What is the oxygen concentration? _____% (21-29)

42. Set the oxygen flow to 1.5 L/min.

43. Slowly open the nitrous oxide flow control valve until the ORMC controls the nitrous oxide.

44. Does the O_2/N_2O FLOW RATIO alarm activate as soon as the ORMC limits the nitrous oxide flow? _____ (Y)

45. What is the oxygen concentration? _____% (21-29)

46. Set the oxygen flow to 2.0 L/min.

47. Slowly open the nitrous oxide flow control valve until the ORMC controls the nitrous oxide.

48. Does the O_2/N_2O FLOW RATIO alarm activate as soon as the ORMC limits the nitrous oxide flow? _____ (Y)

49. What is the oxygen concentration? _____% (21-29)

50. Set the oxygen flow to 3.0 L/min.

51. Slowly open the nitrous oxide flow control valve until the ORMC controls the nitrous oxide.

52. Does the O_2/N_2O FLOW RATIO alarm activate as soon as the ORMC limits the nitrous oxide flow? _____ (Y)

53. What is the oxygen concentration? _____% (21-29)

54. Place the Gas Selector switch in the ALL GASES position.

55. Is the O_2/N_2O FLOW RATIO alarm activated? _____ (N)

56. Place the Gas Selector switch in the $O_2 + N_2O$ position.

57. Slowly begin to close the oxygen flow control valve.

58. Does the nitrous oxide flow decrease accordingly, maintaining a steady oxygen concentration between 21% and 29%? _____ (Y)

ORMC SET UP AND TEST PROCEDURE (continued)

59. Slowly close the oxygen flow control valve to its stop position.

60. Does the nitrous oxide flow stop when the flow os oxygen is reduced to minimum flow? _____ (Y)

61. If NO, then skip to Step 11.

62. Does the O_2/N_2O FLOW RATIO alarm extinguish between 100 ml/min. and 200 ml/min. of nitrous oxide flow? _____ (Y)

63. If YES, then skip to Step 71.

64. If NO, then adjust the MPL (Micro Pneumatic Logic) switch adjustment screw R to deactivate the O_2/N_2O FLOW RATIO alarm.

65. Close the oxygen flow control valve.

66. Slowly increase the oxygen flow until the nitrous oxide begins to flow.

67. Is the O_2/N_2O FLOW RATIO alarm activated? _____ (Y)

68. Slowly close the oxygen flow control valve to its stop position.

69. Does the O_2/N_2O FLOW RATIO alarm extinguish between 100 ml/min. and 200 ml/min. of nitrous oxide flow? _____ (Y)

70. Repeat Steps 64 thru 70 until no further adjustment is required.

71. Close all flow control valves.

72. Turn the System Power switch to STANDBY.

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Technical Service Department
3122 Commerce Drive
Telford, PA 18969
(215) 721-5402
(800) 543-5047
(215) 723-5935 Fax

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